

FALL AND WINTER FOODS OF FLORIDA WHITE-TAILED DEER ¹

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The determination of quantity, availability, and palatability* of natural food supplies is a basic deer management problem. Before palatability and preference of deer foods can be established a knowledge of what food items they ingest is imperative.

Determination of what foods Florida deer (*Odocoileus virginianus* Boddaert) select has been obtained: 1) statewide by an analysis of 423 one-quart rumen samples of deer stomachs, principally from legally killed bucks, 2) from the Ocala Wildlife Management Area by an analysis of 17 deer stomachs, and 3) from the Everglades Wildlife Management Area by analysis of 49 one-quart rumen samples of deer stomachs. The statewide samples were collected during the hunting season months of November to January 1953-59, on the Everglades Wildlife Management Area during the fall and winter periods 1955-58, and on the Ocala Wildlife Management Area from September through February 1952-53. (See Table 1.) Stomach contents were preserved, until analysis, by placing them in an 8 percent solution of formalin. Prior to analysis the samples were washed in a ¼ inch mesh sieve to remove debris and particles too small for identification. The stomach contents were then separated into their component food particles and ocular estimates made of the percentages present.

To determine adequacy of sample size the following formula (Grieb, 1958) was applied:

$$N = \frac{(t.05)^2 (s)^2}{(.10.x)^2}$$

¹ A contribution from Pittman-Robertson Projects, Florida W-41-R, 32-R, and 39-R.

² I wish to acknowledge the advice of Mr. E. B. Chamberlain, Jr., Federal Aid Coordinator, Florida Game and Fresh Water Fish Commission, in the preparation of this manuscript; Mr. Erdman West, Mycologist and Botanist, Department of Plant Pathology, University of Florida, and Dr. A. M. Laessle, Biology Department, University of Florida, for their assistance in the identification of food items.

* Here defined as the degree of succulence and nutritive value.

Where N equals the number of observations or measurements needed.

t.05 is the tabular value of observations or measurements made in the preliminary examination.

s equals the standard deviation of preliminary data.

.10 is the value selected, probability value.

x is the mean of the sample data.

This formula indicated that statewide, 338 samples were needed for the data to fall within 10 percent of the true mean. The 423 samples analysed falls well within the limits fixed by the formula.

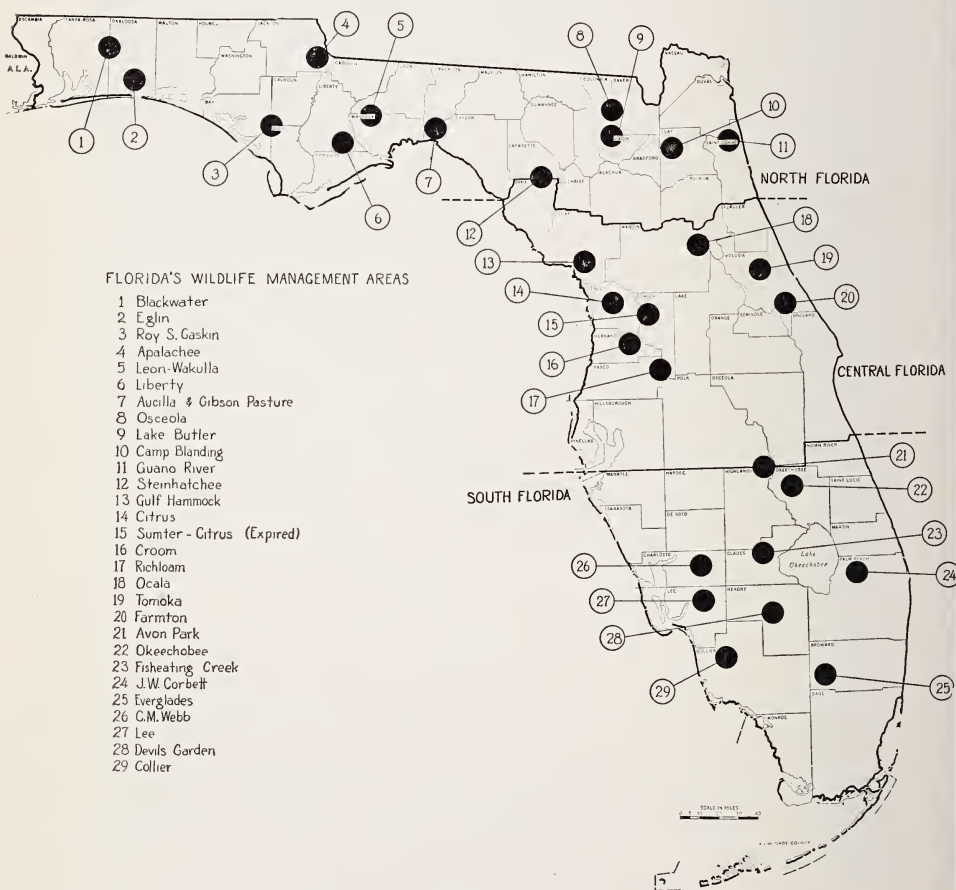


TABLE 1

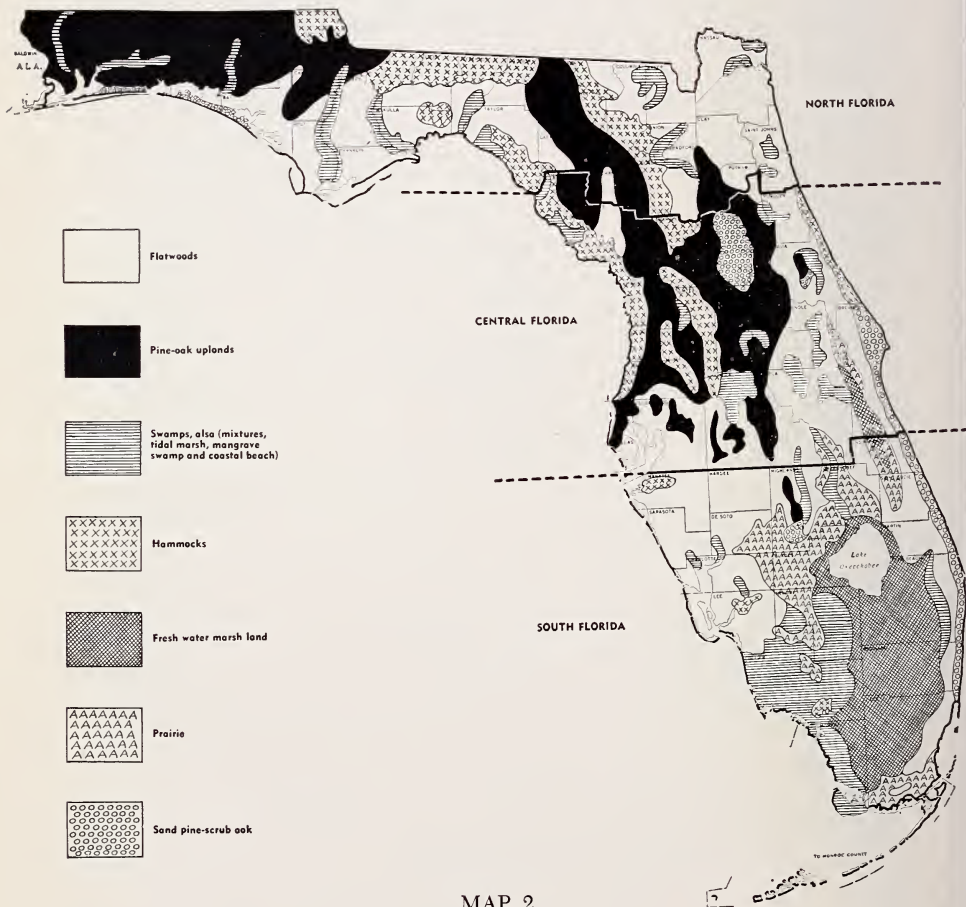
REGIONS OF THE STATE⁴, COUNTIES AND SPECIFIC MANAGEMENT
AREAS WHERE THE DEER STOMACHS AND STOMACH
SAMPLES WERE COLLECTED.

Region	Wildlife Management Area	Counties	Stomachs
North Florida	Camp Blanding	Clay	23
	Lake Butler	Union, Baker, Columbia	10
	Steinhatchee	Dixie, Lafayette	31
	Blackwater	Santa Rosa, Okaloosa	9
	Eglin	Santa Rosa, Okaloosa, Walton	7
	Osceola	Columbia, Baker	35
	Aucilla	Wakulla, Jefferson, Taylor	30
	Gaskin	Gulf, Bay, Calhoun	18
	Liberty	Liberty	13
	Leon-Wakulla	Leon, Wakulla	6
	Gibson's Pasture	Taylor	20
Total			202
Central Florida	Citrus	Citrus, Hernando	45
	Croom	Hernando	22
	Tomoka	Volusia	64
	Farmton	Volusia	37
	Gulf Hammock	Levy	15
	Richloam	Hernando, Pasco, Sumter	14
	Sumter-Citrus	Sumter, Citrus	3
	Volusia Refuge	Volusia	6
	Marion	Marion	1
	Ocala	Marion, Lake	17
Total			224
South Florida	Corbett	Palm Beach	8
	Collier	Collier	3
	Avon Park	Polk, Highlands	2
	Okeechobee	Okeechobee	1
	Everglades	Broward	49
Total			63
Combined Total			489

⁴ As defined by Harper (1914, 1921, 1927).

Principal types of vegetation affecting the food habits of Florida deer (broadly defined) include flatwoods, pine-oak uplands, swamps, hammocks, fresh water marshes, prairies, and sand pine—scrub oak ridges. Although one or two types may be predominant in an area, others are usually present, resulting in a mixture of types. The degree of interspersed of various plant communities is dependent mainly on changes in ground elevation and associated soil characteristics. As slight a difference in elevation as a few inches often results in a marked change in the plant life encountered.³

³ Detailed descriptions of the principal vegetation types listed in this study may be found in reports by Harper (1914, '21 and '27), Laessle (1942), Kurz (1942), Loveless (1959), and Harlow (1959).



MAP 2

Important factors influencing the quantity and species of plants consumed by deer are the ecological stage of the vegetation type, the palatability of the available vegetation, and the competition for food supplies by other animals of similar food habits. In Florida, cattle and hogs are the main competitors with deer for food and living space.

TABLE 2

ITEMS FOUND IN 423 DEER STOMACH SAMPLES COLLECTED
DURING NOV., DEC., AND JAN., 1953-59.

Food Item *	Part Eaten	% of Total Volume	No. Times Taken	% Freq. Occurred
Basidiomycetes	Entire	9.2	328	77.5
Serenoa repens	Berries	8.9	73	17.3
Quercus nigra	Acorns	8.6	69	16.3
Trilisa odoratissima	Basal Leaves	6.9	196	46.3
Ilex glabra	Lvs., Twigs, Berries	6.7	142	33.6
Quercus stellata	Acorns	5.6	41	9.7
Cliftonia monophylla	Lvs., Twigs	5.5	80	18.9
Smilax laurifolia	Lvs., Vine, Berries	5.5	201	47.7
Itea virginica	Lvs., Twigs	4.2	127	30.0
Quercus laevis	Acorns	3.6	39	9.2
Quercus laurifolia	Acorns	3.5	45	10.6
Quercus virginiana	Acorns	3.1	44	10.4
Ilex coriacea	Lvs., Twigs	2.2	50	11.8
Sabal Palmetto	Berries	2.1	41	9.7
Kalmiella hirsuta	Lvs., Twigs	1.6	46	10.8
Vaccinium Myrsinites	Lvs., Twigs	1.5	72	17.0
Quercus spp.	Leaves	1.4	106	22.6
Quercus cinerea	Acorns	1.4	31	7.3
Osmunda regalis	Leaves	1.2	25	5.9
Ilex Cassine	Lvs., Twigs	1.2	47	11.1
Rhus Copalinum	Fruiting Heads	1.1	20	4.7
Quercus laurifolia	Leaves	.67	19	4.4
Magnolia virginiana	Lvs., Twigs	.66	26	6.1
Gelsemium sempervirens	Lvs., Vine	.63	24	5.6
Nyssa spp.	Berries	.65	14	3.3
Quercus myrtifolia	Acorns	.61	14	3.3
Taxodium spp.	Lvs., Twigs	.50	62	14.6
Gramineae (Broadbladed)	Blades, Stems	.49	159	37.5
Legume spp.	Stems, Lvs.	.48	54	10.4
Juncus effusus	Stems	.48	5	1.2
Ilex myrtifolia	Lvs., Twigs, Berries	.47	23	3.7

TABLE 2 (continued)

Food Item *	Part Eaten	% of Total Volume	No. Times Taken	% Freq. Occurred
Rubus spp.	Lvs., Twigs	.43	59	11.5
Acer rubrum	Leaves	.40	20	3.3
Pinus spp.	Needles	.35	146	34.5
Opuntia sp.	Fruit	.35	4	.94
Elephantopus spp.	Basal Leaves	.33	9	2.1
Quercus prinus	Acorns	.32	6	1.4
Unidentified herbaceous leaves	Leaves	.34	85	20.0
Quercus spp.	Acorns	.30	4	.94
Viburnum spp.	Lvs., Twigs	.28	14	3.3
Castalia lekophylla	Leaves	.28	1	.23
Diospyrus virginiana	Fruit	.26	18	4.2
Carphephorus corymbosus	Stem, leaves	.25	3	.70
Vitis spp.	Leaves, vine	.24	22	5.2
Quercus Chapmani	Acorns, leaves	.24	4	.94
Rosa palustris	Leaves, twigs	.23	3	.70
Gordonia lasianthus	Leaves	.22	3	.70
Persea spp.	Leaves	.20	11	2.6
Centella repanda	Stem, Leaves	.20	49	11.5
Hypericum spp.	Stem, Leaves	.19	13	3.0
Cephalanthus occidentalis	Leaves, Twigs	.19	8	1.8
Unidentified Twigs	—————	.19	15	3.5
Cyrilla racemiflora	Leaves, Twigs	.18	11	2.6
Morus sp.	Leaves	.15	3	.70
Myrica cerifera	Fruit, Twigs,	.15	51	12.0
Mitchella repens	Leaves, Vine	.14	17	4.0
Aronia arbutifolia	Leaves	.14	20	3.3
Carpinus caroliniana	Leaves	.12	21	4.9
Gratiola sp.	Stem, Leaves	.12	3	.70
Erigeron sp.	Stem, Leaves	.12	8	1.8
Osmunda cinnamomea	Leaves	.11	18	4.2
Helianthus radula	Stem, Leaves	.11	8	1.8
Annona glabra	Fruit	.11	1	.23

* Following species occurred from .10 percent of total volume to trace (number in parenthesis indicates number of times items were found in stomach samples collected): *Prunus* spp. (3), *Sabal Etonia* (2), Wood chips (1), *Rhus rudicans* (13), *Quercus nigra* (10), Unidentified Vine (1), *Monotropa Brittonii* (6), *Berchemia scandens* (5), *Zanthoxylum fagara* (1), *Ilex* spp. (10) *Ilex ambigua* (5), *Woodwardia* sp. (4), *Ostrya virginiana* (12), *Lyonia lucida* (15), *Xyris* spp. (12), *Ulmus floridana* (7), *Baccharis halimifolia* (15), Compositae (19), *Eugenia axillaris* (1), *Citrus* sp. (2), *Zea mays* (2), *Quercus virginiana* (11), *Belchnum*

Analysis of the 423 stomach samples collected statewide showed that twenty-one different food items made up 83.7 percent of the total volume of foods consumed. One hundred ninety-three different food items were identified.

The 17 major ⁵ fall-early winter north Florida deer foods, arranged in descending order of quantity consumed are: *Quercus* spp. (acorns), Basidiomycetes, *Serenoa repens* (berries), Cliftonia monophylla, *Smilax* spp., *Kalmiella hirsuta*, *Itea virginica*, *Ilex coriacea*, *Quercus* spp. (leaves), *Magnolia virginiana*, *Gelsinium sempervirens*, *Nyssa* pp. (fruits), *Legume* spp., *Ilex myrtifolia*, *Rubus* spp., *Acer rubrum*, and *Viburnum* spp.

The 17 major fall-early winter central Florida deer foods (exclusive of the Ocala Wildlife Management Area), arranged in descending order of quantity consumed, are: *Quercus* spp. (acorns), Basidiomycetes, *Serenoa repens* (berries), *Trilisa odoratissima*, *Ilex*

serrulatum (1), *Cornus stricta* (3), *Vaccinium* spp. (33), *Ceanothus microphyllus* (4), *Juniperus silicicola* (23), *Ilex vomitoria* (6), *Liquidambar styraciflua* (3), *Aster reticulata* (2), *Houstonia* sp. (2), *Vernonia* sp. (1), Fern sp. (8), *Desmodium lucidus* (6), *Viola* sp. (6), *Alternanthera philoxeroides* (1), *Ascyrum tetrapetulum* (9), *Ulmus alata* (3), *Salix longipes* (3), *Hydrocotyle* sp. (3), *Cinnamomum camphora* (1), *Richardia scabra* (1), *Diodia teres* (2), *Thysanella* sp. (5), *Lechea* sp. (2), *Laciniaria* sp. (1), *Berlandiera subacaulis* (1), *Dendropogon usneoides* (45), *Tragia linearifolia* (1), *Mesadenia* sp. (1), *Crataegus* sp. (1), *Xolisma ferruginea* (6), *Phoradendron* sp. (2), *Cirsium* sp. (2), *Centhrus* sp. (1), *Sambucus Simpsonii* (1), *Chrysobalanus icaco* (1), *Stillingia aquatica* (1), *Proserpinaca pectinata* (1), *Phlebodium aureum* (1), *Jussiaea* sp. (1), *Ramalina* (1), *Rhexia* sp. (2), *Persicaria* sp. (2), Lichen (2), *Crinum americanum* (2), *Ceratola ericoides* (3), *Crocantemum corymbosum* (1), *Ceratophyllum* sp. (1), *Heterotheca subaxillaris* (3), *Euonymus americanus* (3), *Solanum aculeatissimum* (1), *Serocarpus bifolius* (1), *Geobalanus oblongifolius* (1), *Calliocalyx americana* (1), *Cassytha filiaformis* (1), *Convolvulus* sp. (1), *Conradine puberula* (1), *Asimina* sp. (1), *Alnus rugosa* (1), *Myriophyllum* sp. (1), *Rhynchospora* sp. (1), *Scutellaria arenicola* (1), *Ceanothus intermedia* (1), *Cracca* spp. (2), *Lespedeza* spp. (5), *Martusia* spp. (1), *Secula* sp. (3), *Galactia* spp. (5), *Petalostemon* sp. (1), *Pilosaxis* sp. (1), *Meibomia* sp. (5), *Sagotia triflora* (1), *Desmodium* sp. (1), *Rhynchosia erecta* (1), *Virburnum rufidulum* (2), *Viburnum semi-tomentosum* (1), *Viburnum obovatum* (4), *Polycodium floridanum* (8), *Gaylussacia dumosa* (22), *Batodendron arboreum* (2), *Taxodium ascendens* (27), *Taxodium distichum* (28), *Pinus clausa* (1), *Pinus palustris* (5), *Pinus elliotti* (20), *Nyssa ursine* (2), *Nyssa sylvatica biflora* (13), *Panicum* spp. (26), *Aristida* spp. (1), *Persea Borbonia* (5), *Persea palustris* (3), *Smilax Walteri* (1), *Smilax auriculata* (1), *Muscadinia* sp. (1), *Vitis* sp. (1), *Coleoptera* (1), *Hyla* (1), Rootstock (2), Bark (3), Orthoptera (1), Flowering Head (2), Elateridae (2), Root ending (1), Ericaceae (1), Cyperaceae (1), Labiatae (2), *Prunus serotina* (2), *Prunus americana* (1), *Ilex decidua Curtissii* (1).

⁵ Major foods for North and Central Florida in Table 2 are those occurring 14 or more times and attaining at least 0.28 percent of total volume. In South Florida major foods may be those occurring only once or amounting to 0.01 percent of total volume.

glabra, *Smilax* spp., *Itea virginica*, *Vaccinium Myrsinites*, *Quercus* spp. (leaves), *Osmunda* spp., *Ilex Cassine*, *Rhus Copalinum*, *Magnolia virginiana*, *Gelsinium sempervirens*, *Nyssa* spp. (fruits), *Taxodium* spp., and *Legume* spp.

The 14 major fall-early winter south Florida deer foods (excluding the Everglades), arranged in descending order of quantity consumed, are: *Serenoa repens* (berries), *Trilisa odoratissima*, *Ilex glabra*, *Smilax* spp., *Vaccinium Myrsinites*, *Osmunda* spp., *Ilex Cassine*, *Taxodium* spp., *Juncus effusus*, *Persea Borbonia*, *Centella repanda*, *Castalia lekophylla*, *Baccharis halimifolia*, and *Salix longipes*.

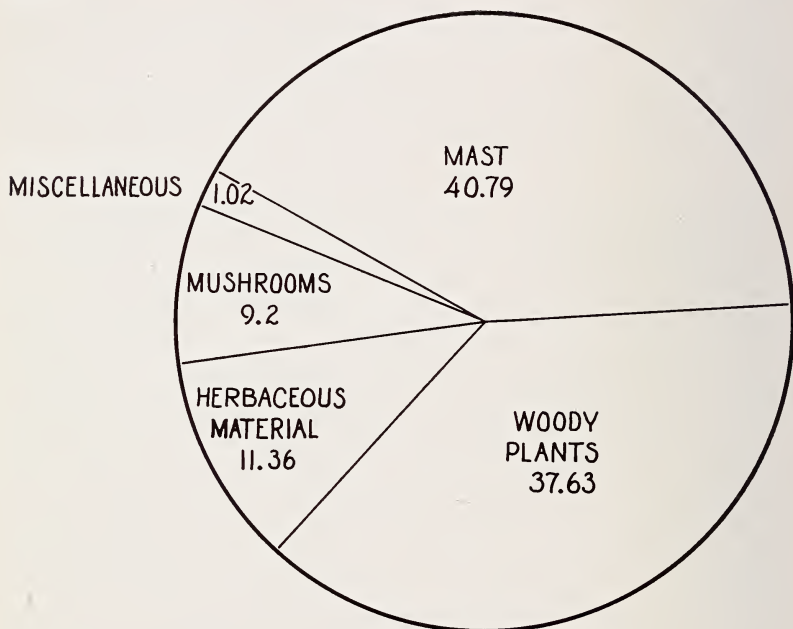


Figure 1. Comparative Percentages of Food Items^a Found in 423 Deer Stomach Samples taken during November, December and January, 1953-59.

MAST SPECIES
(40.79)

Serenoa repens
Quercus nigra
Quercus stellata

Quercus laevis
Quercus laurifolia
Quercus virginiana
Sabal Palmetto
Quercus cinerea
Rhus Copalinum

Nyssa spp.
Quercus myrtifolia
Opuntia sp.
Quercus prinus
Diospyrus virginiana
Annona glabra

^a Species occurring in Table 2 in trace quantities were not included in the above lists.

Sabal Etonia
Citrus spp.
Zea mays

WOODY PLANTS (37.63)

Ilex glabra
Cliftonia monophylla
Smilax spp.
Itea virginica
Ilex coriacea
Kalmiella hirsuta
Vaccinium Myrsinites
Quercus spp.
Ilex Cassine
Quercus laurifolia
Magnolia virginiana
Gelsimium semper-
virens
Taxodium spp.
Ilex myrtifolia
Rubus spp.
Acer rubrum
Viburnum spp.
Vitis spp.
Rosa palustris
Gordonia lasianthus
Persea Borbonia
Hypericum spp.
Cephalanthus
occidentalis

Cyrilla racemiflora
Morus sp.
Myrica cerifera
Mitchella repens
Aronia arbutifolia
Carpinus caroliniana
Rhus radicans
Quercus nigra
Berchemia scandens
Ostrya virginiana
Lyonia lucida
Ulmus floridana
Baccaharris halimifolia
Eugenia axillaris
Quercus virginiana
Cornus stricta
Ceanothus microphyllus
Juniperus silicicola
Ilex vomitoria
Liquidambar stryaciflua
Ascyrum tetrapetulum
Ulmus alata
Salix longipes
Cinnamomum
camphora

HERBACEOUS MATERIAL (11.36)

Trilisa odoratissima
Osmunda regalis
Xyris spp.

Legume spp.
Elephantopus spp.
Aster sp.
Houstonia sp.
Vernonia sp.
Castalia lekophylla
Unidentified herbs
Carphephorus
corymbosus
Centella repanda
Gratiola sp.
Viola sp.
Alternanthera
philoxeroides
Hydrocotyl sp.
Erigeron sp.
Osmunda cinnamomea
Helianthus radula
Woodwardia sp.
Compositae
Richardia scabra
Thysanella sp.
Lechea sp.

MUSHROOMS AND MISCELLANEOUS ITEMS (10.22)

Gramineae
Pinus spp.
Monotropa Brittonii
Basidiomycetes

Basidiomycetes and *Trilisa odoratissima* were the only two foods to show up among the first ten preferred plants over the six year study. *Serenoa repens*, *Ilex glabra*, *Itea virginica*, and *Smilax laurifolia* were among the first ten preferred foods during five of the six years deer stomach samples were collected and examined. Some species of *Quercus* (acorns) were present in the first ten preferred foods each year.

The largest fresh water marsh in Florida is the Everglades. Quantitative data on foods consumed by Everglades deer is presented in Table 4. Loveless (*op. cit.*) presents a detailed study of the food habits of Everglades deer in his bulletin "The Everglades Deer Herd, Life History and Management".

Forty-one species were identified in the stomach samples examined. It will be noted from Table 5 that seven plants constituted 81.8 percent by volume of the stomach samples. Similar to deer in the other habitat types, Everglades deer eat a wide variety of plants but a relatively few key plants compose the bulk of the diet.

TABLE 3
VOLUME RATING OF PREFERRED FOOD PLANTS FROM 423 DEER STOMACH SAMPLES
EXAMINED FROM 1953-59.

Item	Part Eaten	1953			1954			1955			1956			1957			1958		
		Volume Rating	% Taken	Volume Rating	Volume Rating	% Taken	Volume Rating	% Taken	Volume Rating	% Taken	Volume Rating	% Taken	Volume Rating	Volume Rating	% Taken	Volume Rating	% Taken	Volume Rating	% Taken
<i>Serenoa repens</i>	Berries	1	20.6	9	3.6	1	11.6	1	12.3							5	5.2		
<i>Quercus stellata</i>	Acorns	2	18.5													1	13.8		
<i>Basidiomycetes</i>	Entire	3	9.3	3	9.6	3	11.4	3	10.7	6	4.1					2	10.4		
	Berries																		
<i>Ilex glabra</i>	Lvs., Twigs	4	6.2			6	6.8	5	6.6	4	6.4	7	5.1						
<i>Trilisa odoratissima</i>	Basal Lvs.	5	6.0	2	15.6	4	10.3	8	4.0	10	2.9	10	3.1						
<i>Quercus laurifolia</i>	Acorns	6	5.9	5	7.6					7	3.8								
<i>Vaccinium</i>																			
<i>Myrsinites</i>	Lvs., Twigs	7	5.7																
<i>Itea virginica</i>	Lvs., Twigs	8	3.9	4	9.5	8	5.3	10	3.0	9	3.0								
	Berries																		
<i>Smilax laurifolia</i>	Lvs., Twigs	9	3.3			5	7.5	4	7.7	5	5.3	4	7.3						
<i>Ilex coriacea</i>	Lvs., Twigs	10	2.9							8	3.2								
<i>Quercus nigra</i>	Acorns			1	16.2	7	5.5	7	5.2	1	21.2					3	7.7		
<i>Quercus virginiana</i>	Acorns			6	7.4														
<i>Osmunda regalis</i>	Leaves			7	4.8														
<i>Kalmiella hirsuta</i>	Lvs., Twigs			8	3.8														
<i>Cliftonia</i>																			
<i>monophylla</i>	Lvs., Twigs			10	3.6														
<i>Sabal palmetto</i>	Berries					2	11.5									6	5.2		
<i>Ilex Cassine</i>	Lvs., Twigs					9	4.4												
<i>Quercus laevis</i>	Acorns															2	13.9		
<i>Quercus spp.</i>	Leaves																		
<i>Nyssa sylvatica</i>	Berries															8	4.7		
																9	2.9		
Totals			82.3		81.7		77.2		69.2		72.4		65.4						

TABLE 4

STOMACH CONTENTS OF 49 EVERGLADES DEER FROM THE FALL AND WINTER PERIODS, 1955-58.

Food Item*	% of Total Volume	% Frequency Occurrence
<i>Nymphaea odorata</i> Ait.	28.7	73.5
<i>Osmunda regalis</i>	15.2	67.3
<i>Crinum americanum</i>	10.2	65.3
<i>Salix amphibia</i>	10.9	69.4
<i>Hymenocallis tridentata</i>	7.0	26.5
<i>Ludwigia natans</i>	3.7	16.3
<i>Jussiaea peruviana</i> L.	6.1	28.6
<i>Smilax</i> sp.	2.3	20.4
<i>Sambucus Simpsonii</i>	3.6	36.7
<i>Myrica cerifera</i> L.	2.0	8.1
<i>Ludwigia alata</i> ***	Trace**	12.2
<i>Nymphoides aquaticum</i>	1.4	10.2
<i>Baccharis glomeruliflora</i>	2.0	22.4
<i>Utricularia</i> sp.	1.2	28.5
<i>Panicum</i> sp.	1.0	26.5
<i>Cyperus haspan</i>	Trace	10.2
<i>Gerardia purpureum</i>	Trace	8.1
Unidentified material	1.8	—

*Following species occurred as traces: *Apios americana* Medis., *Aster* sp., *Bacopa* sp., *Bidens bevis* (L.) B.S.P., *Dryopteris* sp., *Eleocharis* sp., *Hypericum virginicum* L., *Ipomea* sp., *Lachnanthes* sp., *Melothria pendula*, *Mikania scandens*, *Nephrolepis exaltata*, *Oxypolis* sp., *Polyporus* sp., *Proserpinaca palustris*, *Psidium Guava*, *Pueraria Thunbergiana*, *Rhynchospora* sp., *Rivina humilis*, *Sagittaria lancifolia*, *Vicia acutifolia*, *Vigna luteola* (Jacq.) Benth, and *Woodwardia virginica* Smith.

**Trace; less than 0.5 percent by volume or 8.0 percent frequency of occurrence.

***Utilized extensively when available.

Note that in deer stomachs examined from the Everglades, herbaceous material totalled more than twice the amount of all other types of food combined and that over 70 percent of the herbs consumed were hydrophytic.

The Ocala National Forest (central Florida) is the largest single sand pine-scrub oak unit in the State comprising approximately 441,925 acres. According to Strode (1954), 68.0 percent of the Ocala Wildlife Management Area is composed of sand pine-scrub oak habitat. Because of the unique vegetative characteristic of the

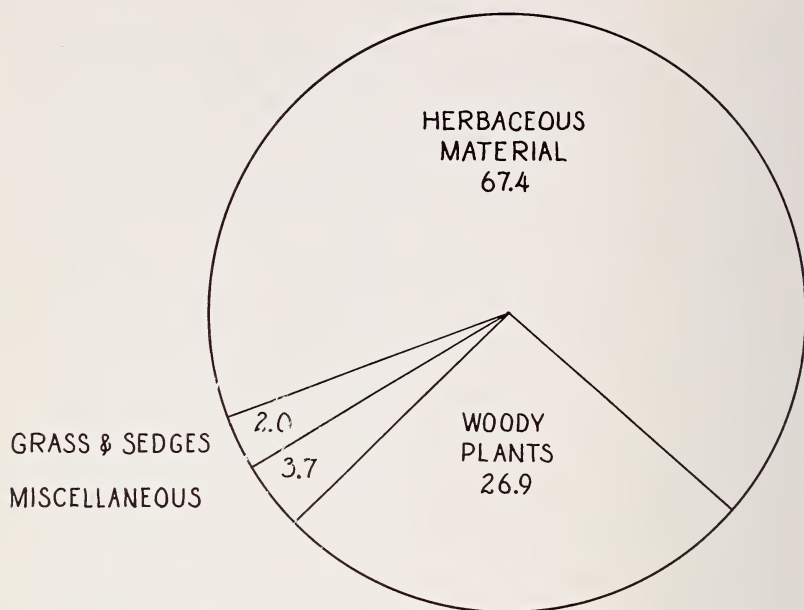


Figure 2. Comparative Percentages of Food Items Found in 49 Deer Stomachs taken During the Fall and Winter Periods, 1955-58 From the Everglades.

HERBACEOUS MATERIAL (67.4)

Hydrophytic Forbs (52.2)
Nymphaea odorata
Crinum americanum
Hymenocallis tridentata
Ludwigia alata
Nymphoides aquaticum
Utricularia sp.
Gerardia purpureum
Bacopa caroliniana
Eleocharis sp.
Lachnanthes trictoria
Oxypolis filiformes
Proserpinaca palustris
Sagittaria lancifolia

WOODY PLANTS (26.9)

(Trees, Shrubs and Vines)
Salix amphibibia
Sambucus Simpsonii
Jussiaea peruviana
Baccharis glomerulifera
Myrica cerifera

Aster carolinianus
Ipomea sagittata
Melothria pendula
Mikania scandens
Vicia acutifolia
Psidium Guajava

MESOPHYTIC FORBS (15.2)

Including Ferns
Osmunda regalis
Bidens bevis
Hypericum virginicum
Nephrolepis exalata
Pueraria Thunbergiana
Rivina humilis

GRASSES AND SEDGES (2.0)

Mariscus jamaicensis
Cyperus haspan
Panicum sp.
Rynchospora sp.

MISCELLANEOUS (3.7)

Unidentified Material
Polyporus hydnoides

TABLE 5

FOOD ITEMS FOUND IN SEVENTEEN DEER STOMACHS COLLECTED
ON THE OCALA WILDLIFE MANAGEMENT AREA
FROM SEPTEMBER TO FEBRUARY 1952-53.

Food Item *	Part Eaten	% of Total Volume	No. Times Taken	% Freq. Occur.
Sabal Etonia	Fruits	31.10	7	41.1
Basidiomycetes	Entire	25.15	13	76.4
Quercus spp.	Acorns	19.60	13	76.4
Quercus spp. and Sabal sp.	Acorns and			
	Palmetto Berries	6.45	1	5.8
Quercus myrtifolia	Acorns	5.05	4	23.5
Quercus Chapmanii	Acorns	4.46	12	70.5
Galactia sp.	Stems, Lvs.	1.50	1	5.8
Vaccinium Myrsinites	Lvs., Twigs	1.34	12	70.5
Leaves	_____	0.85	10	58.8
Neopieris mariana	Lvs., Twigs	0.72	1	5.8
Quercus virginiana	Acorns	0.60	1	5.8
Phorodendron flavescens	Leaves	0.53	3	17.6
Gramineae	Stems, Blades	0.38	14	82.3
Lyonia lucida	Lvs., Stems	0.29	3	17.6
Geobalanus oblongifolius	Lvs., Twigs	0.28	2	11.7
Pinus clausa	Needles	0.28	11	64.6
Legume sp.	Lvs., Stems	0.21	1	5.8
Smilax laurifolia	Lvs., Vine	0.16	3	17.6
Ilex Cassine	Leaves	0.16	1	5.8
Quercus nigra	Leaves	0.15	1	5.8
Stylisma angustifolia	Lvs., Stem	0.15	2	11.7
Pityothamnus pigmaeus	Lvs., Stem	0.13	2	11.7
Quercus laevis	Leaves	0.07	3	17.6
Twigs	_____	0.07	6	35.3
Coleoptera	_____	0.07	1	5.8
Nyssa sylvatica	Fruit	0.10	1	5.8
Gaylussacia dumosa	Lvs., Twigs	0.06	1	5.8
Ceratiola ericoides	Lvs., Twigs	0.05	3	17.6
Chrysopsis graminifolia	Lvs., Stems	0.04	1	5.8
Total		100.00		

* Following species occurred as traces: *Ascyrum linifolium*, Bark, *Batodendron arboreum*, *Chamaecrista brachiata*, *Cracca ambigua*, *Dendropogon usneoides*, *Erythrina herbacea*, *Galactia Elliottii*, *Galactia regularis*, *Ilex glabra*, Larvae, Lichen, *Ludwigia suffruticosa*, *Martinusia mariana*, *Mayaca fluviatilis*, *Pinus palustris*, *Quercus geminata*, *Ramalina* sp., *Rhynchosia simplicifolia*,

"Big Scrub" and the large deer herd present, a separate food habits study was conducted. Table 5 presents quantitative data on the food items found in the seventeen deer stomachs analysed.

TABLE 6

DEER FOODS MOST HEAVILY UTILIZED IN THE SEVEN MAJOR TYPES OF VEGETATION AS DETERMINED BY ANALYSIS OF THE CONTENTS OF 489 DEER STOMACHS.

Food Item	Part Eaten	Major Types of Vegetation Where Foods are Found *							
		F	P-OU	S	H	P	SP-SO	FWM	
Quercus spp.	Acorns	X	X	X	X		X		
Quercus spp.	Leaves	X	X	X	X		X		
Basidiomycetes	Entire	X	X		X		X		
Serenoa repens	Berries	X					X		
Sabal Etonia	Berries						X		
Sabal Palmetto	Berries				X				
Trilisa odoratissima	Leaves	X							
Ilex Glabra	Lvs, Twigs, Brs	X			X	X			
Ilex coriacea	Lvs, Twigs, Brs	X			X	X			
Ilex Cassine	Lvs, Twigs				X	X	X	X	
Ilex myrtifolia	Lvs, Twigs, Brs				X	X			
Itea virginica	Lvs, Twigs				X	X			
Smilax spp.	Lvs, Vine, Brs	X	X	X	X		X	X	
Cliftonia monophylla	Lvs, Twigs			X	X				
Kalmiella hirsuta	Lvs, Twigs	X	X						
Vaccinium Myrsinites	Lvs, Twigs	X	X				X		
Osmunda Regalis	Fronds			X	X			X	
Rhus Copalinum	Fruiting Hds	X	X						
Magnolia virginiana	Lvs, Twigs			X	X				
Gelsimium sempervirons	Lvs, Vine				X				

Rhynchosia tomentosa, Flower buds, Vines, *Myrica cerifera*, Charcoal, *Erigeron vernus*, *Garberia fruticosa*, Larvae, *Meibomia* sp., *Tamala humilis*, *Xolisma ferruginea*.

Note that eight species make up 94.65 percent by volume of the 59 food items occurring in the seventeen deer stomachs. The eight species occurring in greatest quantity are *Sabal Etonia* (Fruits), *Basidiomycetes*, *Quercus* spp. (acorns), Mast species (oak acorns and palmetto berries), *Quercus myrtifolia* (acorns) and *Quercus Chapmani* (acorns).

TABLE 6 (continued)

Nyssa spp.	Fruits			X				
Taxodium spp.	Lvs, Twigs			X				
Gramineae (broadbladed)	Stems, Blades	X	X		X	X		
Legume spp.	Lvs, Stems	X	X					
Juncus effusus	Stems	X		X		X		
Rubus spp.	Lvs., Twigs	X		X	X			
Acer rubrum	Leaves			X	X			
Pinus spp.	Needles	X	X				X	
Viburnum spp.	Lvs, Twigs			X	X			
Diospyrus virginiana	Fruits		X		X			
Vitis spp.	Leaves	X			X			
Centella repanda	Stem, Lvs	X		X	X			
Nymphaea odorata	Leaves			X		X	X	
Crinum americanum	Leaves			X		X	X	
Salix spp.	Lvs, Twigs			X		X	X	
Hymenocallis tridentata	Leaves						X	
Ludwigia natans	Leaves	X					X	
Jussiaea peruviana	Leaves			X	X		X	
No. of Major Species Present		19	11	21	22	7	8	9

* F (flatwoods), P-OU (pine-oak uplands), S (swamps), H (hammocks), P (prairies), SP-SO (sandpine-scrub oak), FWM (fresh water marshes).

Although some of the plant species are found in more vegetation types than indicated in Table 6, they are found most commonly in the types as listed.

Hammock habitat⁷ contained the greatest number of heavily utilized deer food plants with swamps second, flatwoods third, followed in order by pine-oak upland, freshwater marshes, sand pine-scrub oak ridges, and prairies. Utilization as defined in Table 6 is based on both the quantity of the plant species consumed and in the frequency of occurrence. A few of the plant species listed in Table 6 were low in total volume taken and high in the number of occurrences.

In connection with deer stomach analysis studies, extensive browse investigations have been undertaken by Loveless (*op. cit.*) and Harlow (*op. cit.*). A number of plants, it was noted, occurring

⁷ Laessle (*op. cit.*) defines hammocks as "woods dominated by hardwood evergreen trees occurring on a variety of soils ranging from well-drained to nearly saturated but never flooded".

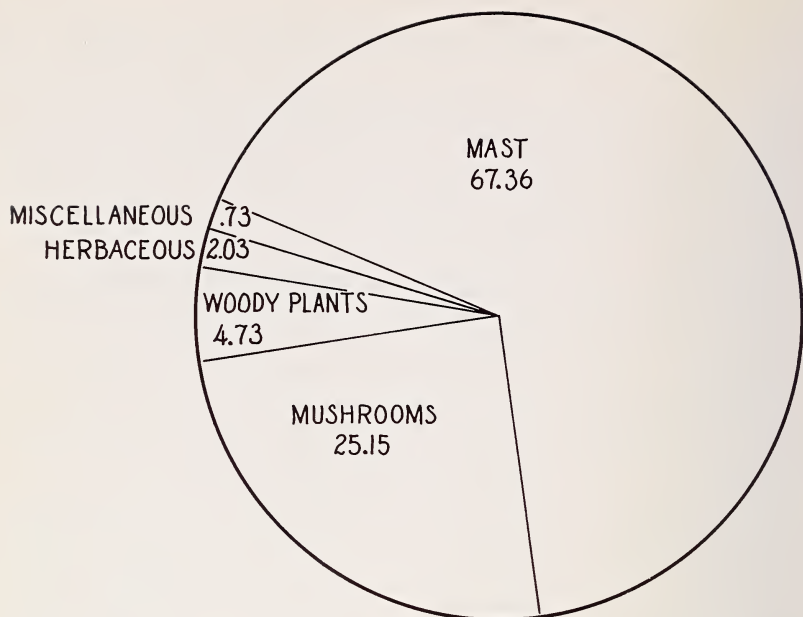


Figure 3. Comparative Percentages of Food Items^{*} Found in Seventeen Deer Stomachs Collected from the Ocala Wildlife Management Area During September through February 1952-53.

MAST (67.36)

Sabal Etonia

Quercus spp.

Quercus myrtifolia

Quercus Chapmanii

Quercus virginiana

Nyssa sylvatica

MUSHROOMS (25.15)

WOODY PLANTS (4.73)

Vaccinium Myrsinites

Neopieris mariana

Phorodendron flavescens

Lyonia lucida

Geobalanus oblongifolius

Smilax laurifolia

Ilex Cassine

Quercus nigra

Quercus laevis

Twigs

Gaylussacia dumosa

Ceratiola ericoides

HERBACEOUS FLOWERING
PLANTS (2.03)

Galactia

Legume sp.

Stylisma angustifolia

Pityothamnus pigmaeus

Chrysopsis graminifolia

MISCELLANEOUS (0.73)

Gramineae

Pinus clausa

Coleoptera

Note the importance of *Sabal Etonia* and *Quercus* spp. in the diet of deer dwelling in the Ocala National Forest. Acorns and palmetto berries constituted 67.26 percent of the deer stomach contents examined.

^{*} Species occurring in Table 5 in trace quantities are not included in the above lists.

TABLE 7

HEAVILY BROWSED PLANTS, FOUND OCCURRING IN LIGHT TO TRACE QUANTITIES IN DEER STOMACHS, LISTED BY THE HABITAT TYPES IN WHICH THEY MOST COMMONLY OCCUR.

Food Item	Major Types of Vegetation in Which Foods are Found						
	F	P-OU	S	H	P	SP-SO	FWM
Baccaharris spp.	X		X	X			X
Trilisa paniculata	X						
Eupatorium mikanioides	X						
Myrica cerifera	X		X	X			X
Vitis spp.	X		X	X			
Gaylussacia sp.	X		X	X			
Viburnum rufidulum			X	X			
Polycodium floridanum			X	X			
Juniperus silicicola				X			
Viburnum obovatum				X			
Ampelopsis arborea				X			
Berchemia scandens				X			
Cornus stricta				X			
Carpinus caroliniana				X			
Cretaegus Marshalli				X			
Acer floridanum				X			
Sambucus Simpsonii				X			
Batodendron arboreum				X		X	
Cephalanthus occidentalis				X			X
Ficus aurea				X			X
Nyssa sp.				X			
Aronia arbutifolia	X		X	X			
Ilex vomitoria			X	X			
Osmanthus americanus			X	X			
Cyrilla racemiflora			X	X			
Rivina humilis							X
Dicliptera assurgens							X
Convolvulus aculeatus							X
Total Number	7	0	8	23	0	1	7

Note that hammocks contain the greatest number of heavily utilized plants.

in light to trace quantities in deer stomachs revealed heavy browsing when observed growing in their respective habitats. Table 7 lists these woody plants according to the major vegetation type in which they are found.

SUMMARY

Determination of what foods deer select has been obtained by analysis of 423 one quart rumen samples of deer stomachs collected statewide, 49 one quart rumen samples of deer stomachs collected from the Everglades Wildlife Management Area and seventeen complete stomachs from the Ocala Wildlife Management Area.

Stomachs and stomach samples were collected during the fall and winter months from 1953-59.

An analysis of the 423 one quart rumen samples of deer stomachs collected statewide showed that mast (acorns and palmetto berries) totalled 40.79 percent by volume, woody plants 37.63 percent, herbaceous material 11.36 percent, mushroom 9.2 percent and grasses, etc. 1.02 percent. Twenty-one plant species amounted to 83.7 percent of the total volume of the 193 food items found present.

An analysis of 49 one quart rumen samples of deer collected from the Everglades Wildlife Management Area showed that herbaceous material totalled 67.4 percent by volume, woody plants 26.9 percent and grasses, sedges and miscellaneous 5.7 percent by volume. Of the 41 plant species identified in the stomach samples examined seven plants constituted 81.8 percent by volume.

The seventeen complete stomachs collected and analysed from the Ocala Wildlife Management Area showed that mast (acorns and palmetto berries) totalled 67.26 percent by volume, mushrooms 25.15 percent, wood plants 4.73 percent, and herbaceous and miscellaneous material 2.03 percent by volume. Eight plant species made up 94.65 percent by volume of the 59 food items occurring in the seventeen deer stomachs examined.

Comparing the number of most heavily utilized plants in the seven major types of vegetation, based on both stomach analysis and browse investigations, hammocks contained the greatest number (45), swamps second (29), followed in order by flatwoods (26), freshwater marshes (16), pine-oak uplands (11), sandpine-scrub oak (9), and prairies (7).

Statewide Florida deer feed on a wide variety of plant species, but comparatively few plants compose the bulk of the diet.

Where oaks and palmettos are present in deer habitat, the oak acorns and palmetto berries constitute a major portion of the deer's diet.

In flatwoods and pine-oak uplands habitats mushrooms are an important deer food.

In Everglades deer range (fresh water marshes) forbes, mainly hydrophytic, were utilized in greatest quantity with woody plants second.

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